

Carbon Markets, Electricity Prices and “Windfall Profits”



Emerging Information on the European Union Emissions Trading Scheme

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Agenda



- Concern for “windfall profits”
- “Real world” factors affecting cost pass-through
- Empirical information
- Policy proposals
- Conclusions and implications



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Concern for “Windfall Profits” and “Real World” Complications

Why has EU ETS given rise to concerns about “windfall profits”?



1. Electricity prices have risen steeply in 2005, coinciding with rise in CO₂ prices in EU ETS
2. Price increase not matched by CO₂ cost increase for all generators (e.g., nuclear, other low emitters)
3. “Opportunity costs” account for substantial part of the added generator costs, due to free allocations

Note, not clear that concern is with profits, since focus seems to be on electricity prices

Prices and “profits” affected by many factors



Example: higher gas prices with gas on the margin

- Affects participants differently
 - Higher electricity price
 - Gains to non-gas facilities (e.g., coal, nuclear, renewables)
 - Gains also to more efficient gas plants if not on the margin (costs increase less than revenue)
- “Windfall” reflects normal functioning of liberalized market
 - Pass-through to end-users reflects costs of marginal generating unit
 - Low users of scarce / expensive resource benefit
 - Efficient units benefit
 - New investment steered by likely profitability, helping preserve efficiency of supply
 - Long-term adjustments may moderate effects (e.g., adjustment to demand)
- **“Windfall profits” not necessarily helpful concept**
 - **Price signals help promote efficiency in consumption, production, and investment.**

Will electricity prices rise by full cost of CO₂ in “real world”?



- **“Standard factors” affecting electricity price impact and generator impacts**
 - Price of CO₂ allowances
 - Marginal vs. non-marginal generation
 - Shift in electricity market merit order
 - Diversity in carbon intensity of marginal generation
 - Long-run electricity market effects

- **Additional “Complicating factors”**
 - Allowance allocation methodology (new entrant set-aside)
 - Regulation in electricity markets
 - Competitive conditions in electricity markets
 - International trade in electricity
 - Other climate policy (e.g., green/white certificates)
 - Government constraints on electricity prices and/or windfall profits

- **Bottom line: Electricity price may not reflect all of the added CO₂ costs, particularly in the long-term**

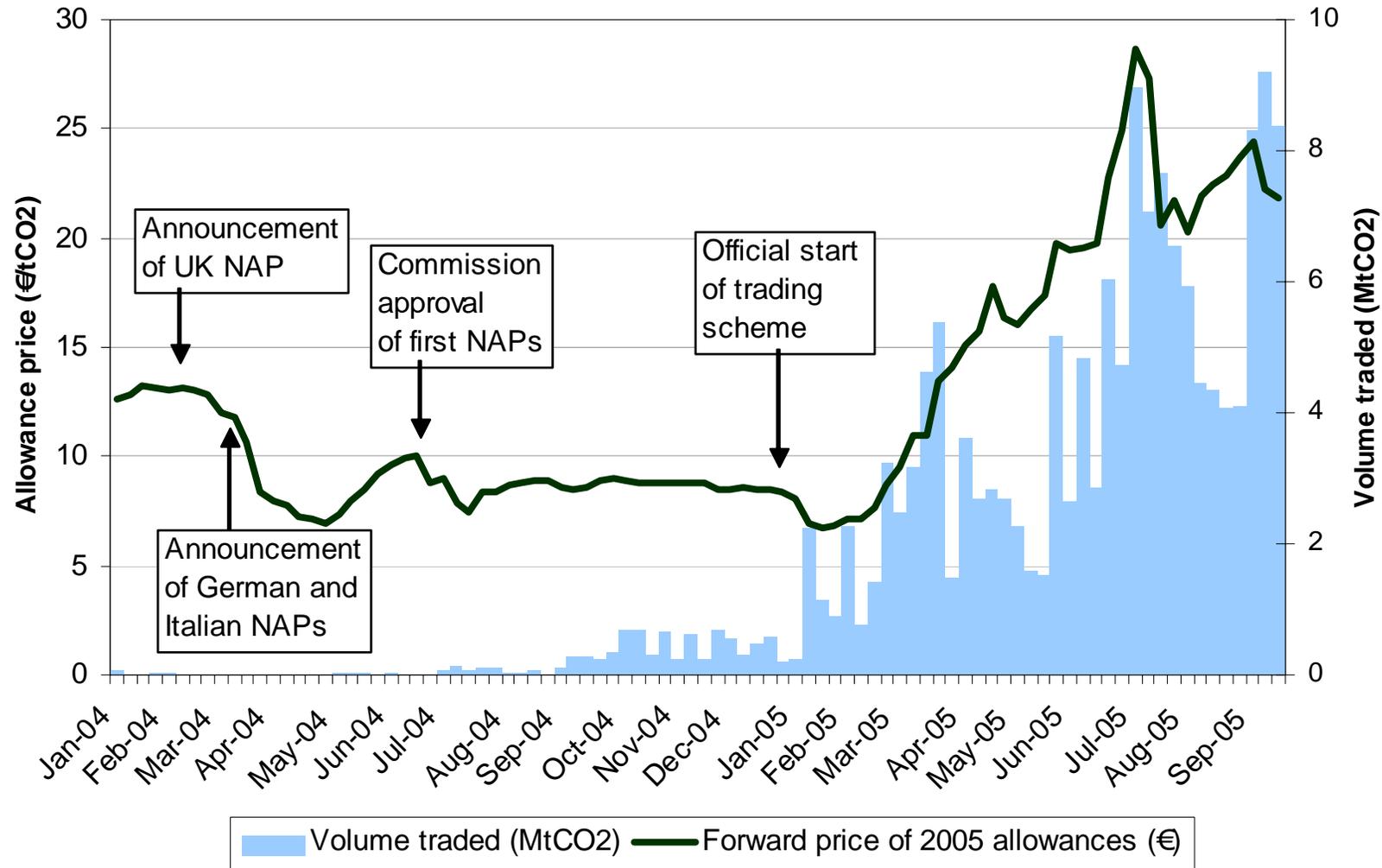


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Recent Empirical Information regarding CO₂ and Electricity Prices

There was a steep rise in 2005 in CO₂ allowance price

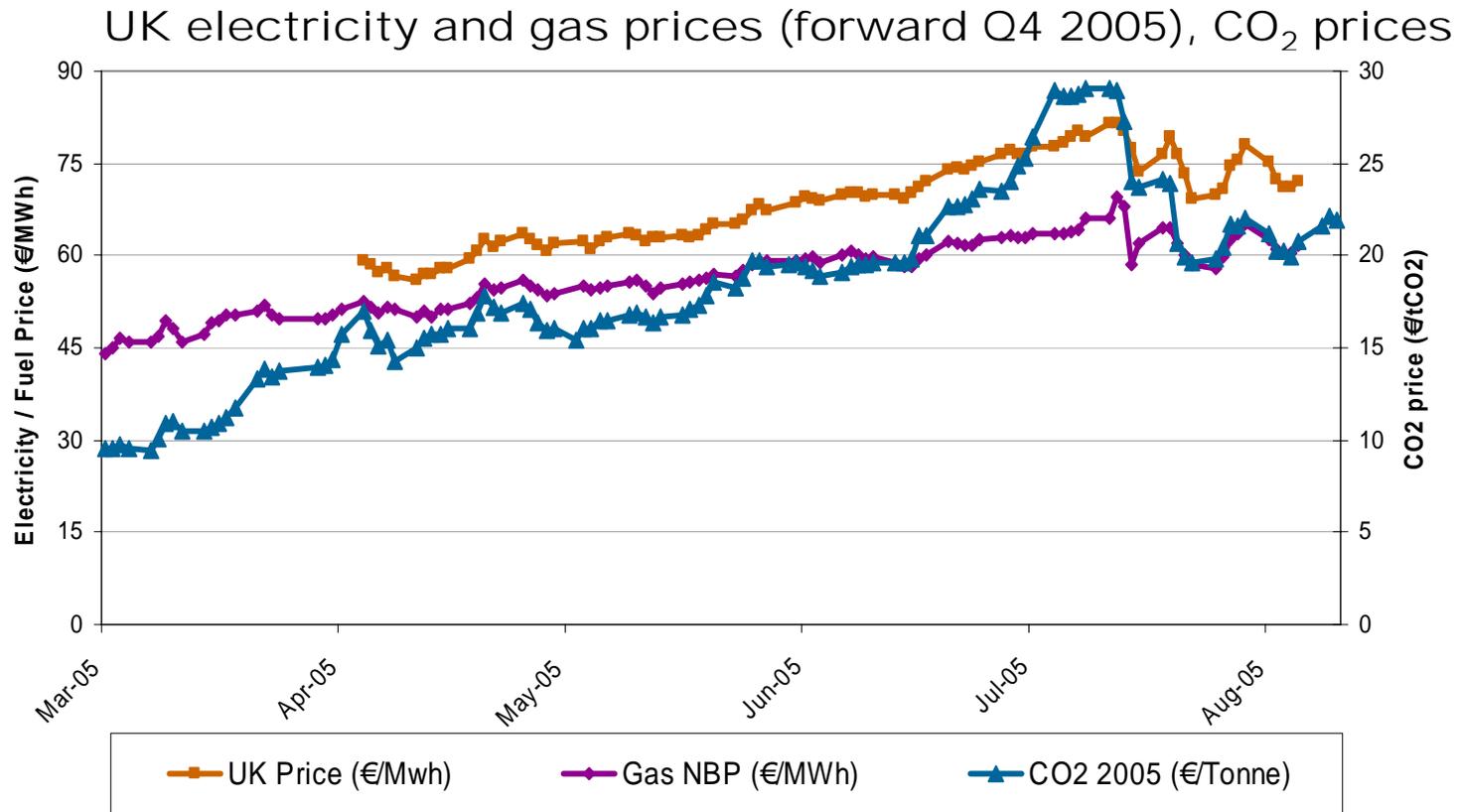


Source: PointCarbon, with annotations by NERA

UK electric, gas, CO₂ prices all have risen since March



Price movements reflect complex interactions among CO₂, fuel (oil, gas, coal) and electricity markets



Source: Platts, PointCarbon and NERA calculations

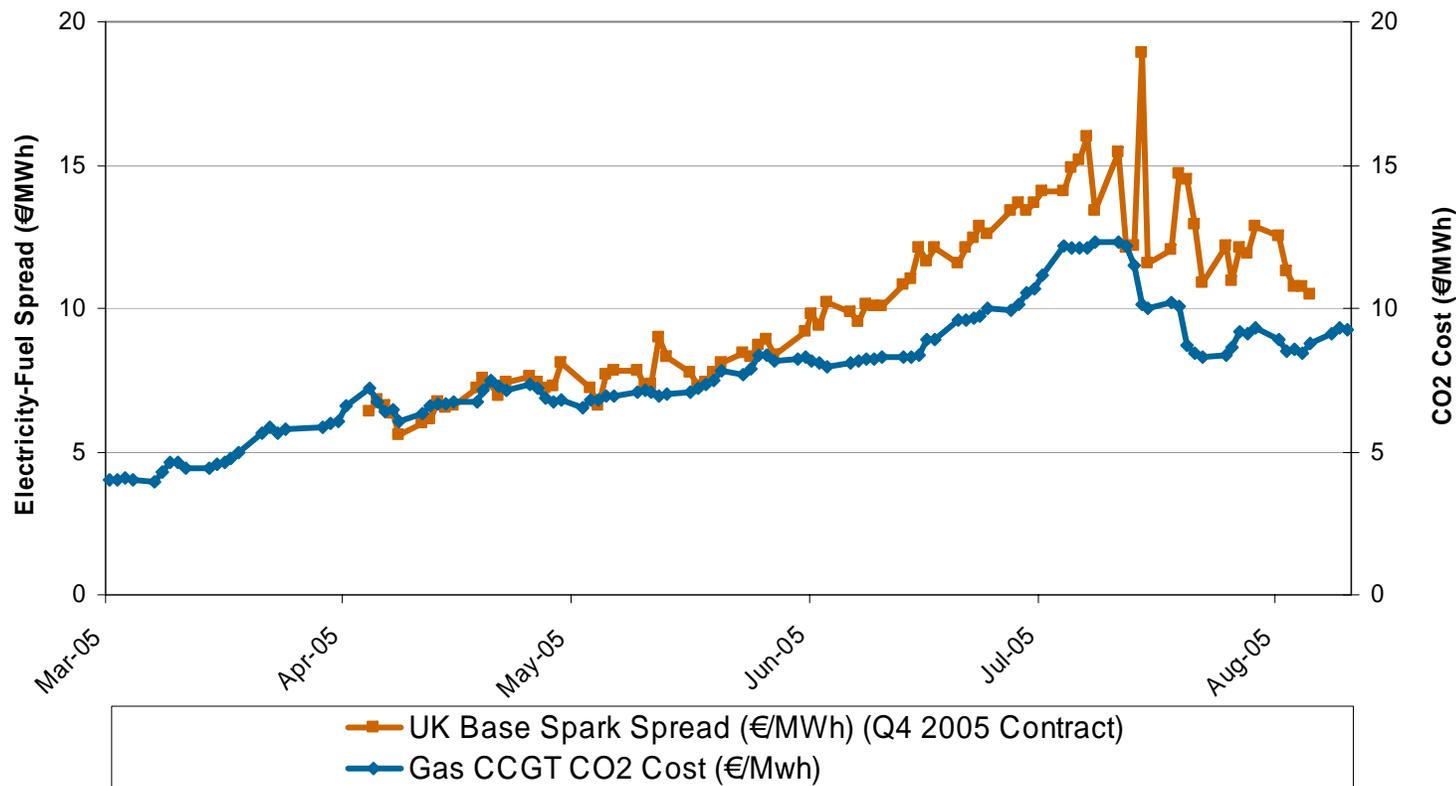
Recent UK electricity market seems to reflect CO₂ costs for gas



Correlation between UK “spark spread” (electricity price minus gas cost) in Q4 2005 forward prices and CO₂ costs for combined cycle gas turbine

Note that coal units also relevant for some periods, complicating relationship

UK base spark spread (Q4 2005), CO₂ cost of CCGT



Source: Platts, PointCarbon, and NERA calculations

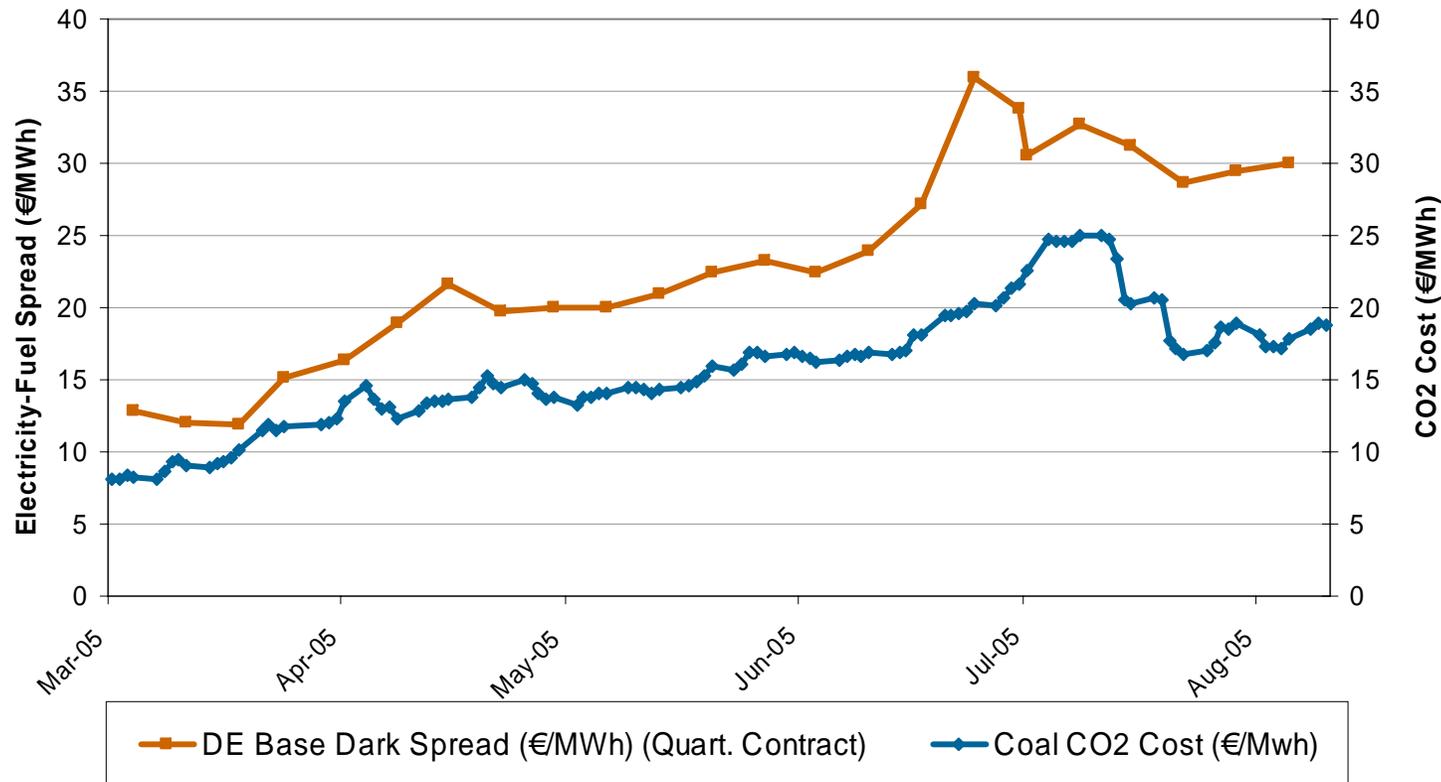
Recent German electric market also linked to CO₂, with complications



Correlation between German “dark spread” (electric price minus coal cost) in forward prices (one quarter ahead) and CO₂ costs for coal unit

Costs for gas units also relevant for this market, complicating relationship

Germany base dark spread, CO₂, cost of coal



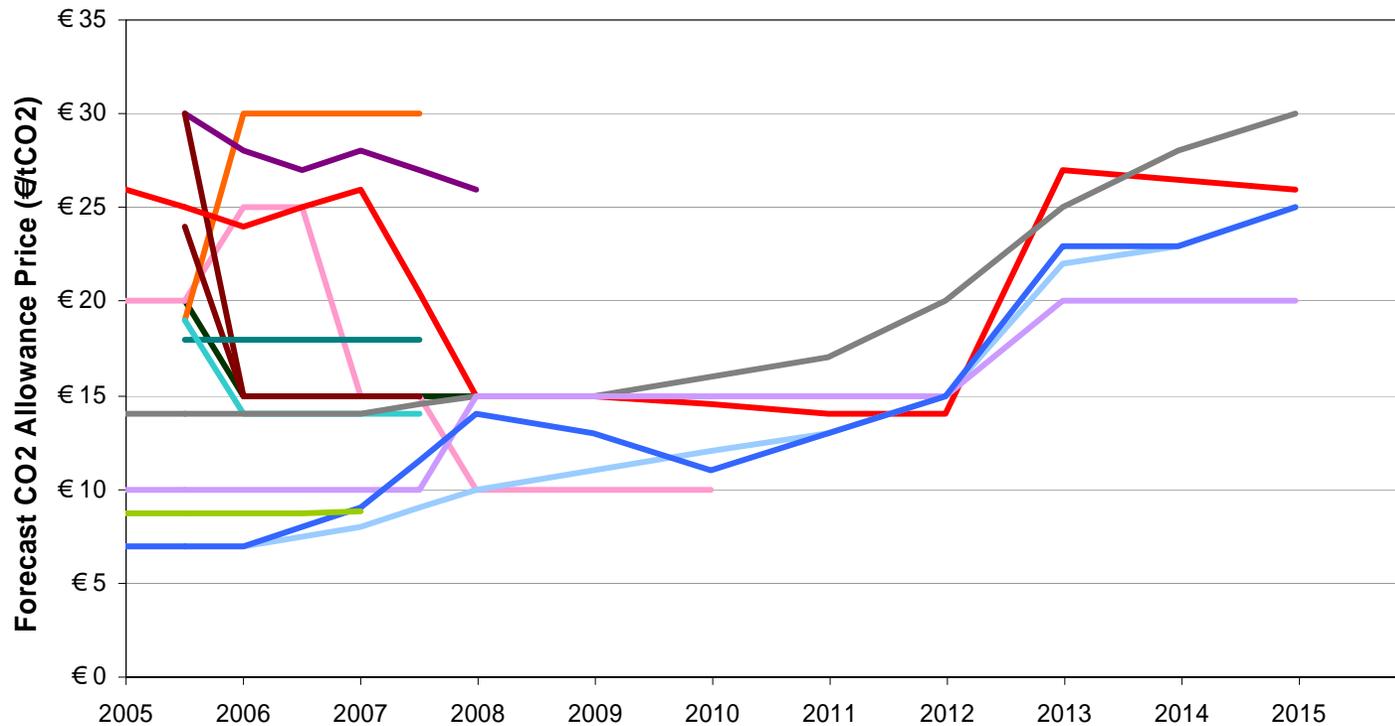
Source: Platts, PointCarbon, and NERA calculations

Forecasts of CO₂ price vary near-term but converge long-term



- Uncertainty about future CO₂ prices
 - Large variations in forecasts for Phase I
 - Fewer forecasts (and less variation) for Phase II and beyond
 - Bottom line: CO₂ price consensus is elusive, even in near term

Equity Analyst 2005 Forecasts of CO₂ Allowance Price

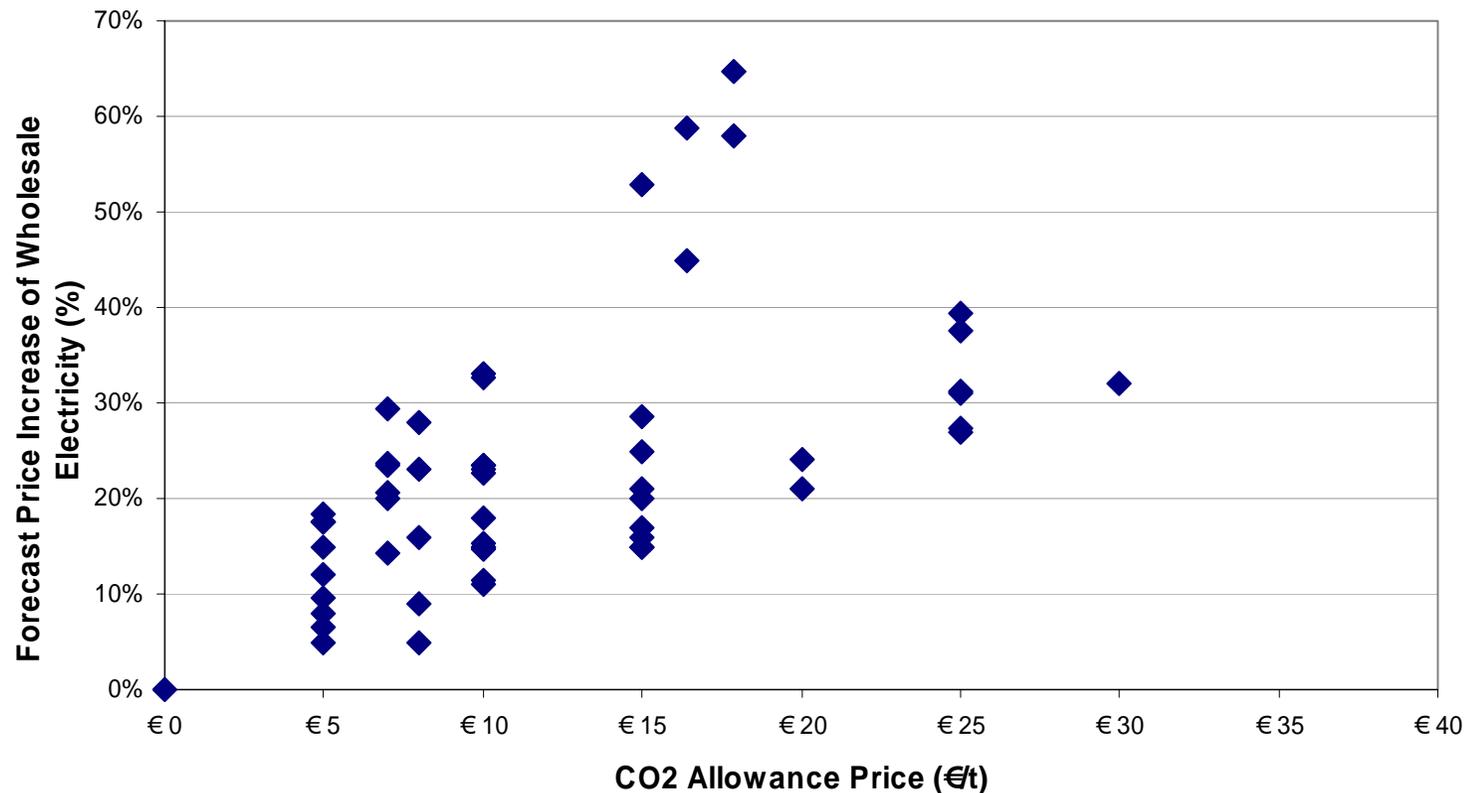


Forecasts of electricity price impacts of given CO₂ price vary widely



- Variation in CO₂ price forecasts is compounded by variation in electricity price impacts
- Some differences due to year and markets analyzed
- But forecasts also differ in sophistication and accounting for complicating factors

Forecast Price Increase of Wholesale Electricity



Studies suggest future electricity price-CO₂ price link complicated



Complications Considered in Various Studies and Reports

	Analyst reports	Modeling studies	Theoretical studies
Number reviewed	22	8	5
Marginal fuels?	5	8	5
Allocation / New entrant?	0	8	3
Electricity regulation?	2	3	2
Electricity market structure?	22	7	5
Possible government intervention?	3	4	2
Other policies (e.g., renewable energy programs)?	0	0	1

Summary of recent empirical observations



- **Large variations in forecasts of CO₂ and electricity price effects going forward**
- **CO₂ costs appear to affect recent electricity prices, but not in the “simple” way of one-to-one pass-through**
 - No simple one-to-one relationship for marginal units in recent data
 - Non-marginal units affected differently (e.g., coal, nuclear, hydro)
 - Correlations recent and in immature CO₂ market
 - Long-term impacts may differ from current snapshot
- **Complicating factors likely to intervene in the future**
 - “Updating” allowance allocation (new entrants, closure rules)
 - Future oil/gas prices
 - Electricity market structure and strategy
 - Bilateral deals between generators and large customers
 - Government policy (or threat thereof)



Government Policy and “Windfall Profits”

Many Policies Proposed by Government/Private Groups



Country / Entity	Type of intervention	Details	Implementation
Alliance of Power-Intensive Industries	Wholesale price regulation	Opportunity costs of CO ₂ to be excluded from bids	Proposed in several position papers
Ireland (1)	Wholesale price regulation	Regulation of allowable revenue of dominant generator	In force
Ireland (2)	Revenue “recycling”	Additional levy on generators used to subsidize transmission charge	Shelved for the time being
Spain (1) (Various others)	Regulation of retail prices	Electricity rate increase limited to < 2 percent	In force
Spain (2)	Allocation / transfer reduction	CTC (stranded cost) payments or allocations to be reduced	Proposed in recent White Paper
France	Special “industry tariffs”	Long-term discounted electricity contracts facilitated by government	Announced, not implemented
Germany	“Industry tariffs”? Regulation of pricing?	Competition authority investigating pass-through of opportunity costs	No action taken yet
Sweden, Finland, etc.	Potential “windfall profit “ taxes	-	Potential policies currently being investigated

Recent policy proposals can be put in four categories



1. **Change allocations/ taxes on generators**

- Provide fewer allowances to generators
- Tax “windfall profits”

2. **Revenue “recycling”**

- E.g., allowance auction to generator combined with subsidy of transmission charges

3. **Wholesale price regulation**

- (re-)regulation of markets, using residual regulatory power to limit increases

4. **Retail price regulation**

- Limited rate increases with rising wholesale price
- Special “industry” tariffs

Two apparent objectives: (1) Profits and (2) Electricity Prices



1. Profits:

- Some generators perceived to receive “unearned” profits
- Applies to sites receiving free allocation
- But *a/so* to sites not covered by scheme (nuclear, large hydro, renewables)

2. Electricity prices:

- Customers perceived to be transferring money directly to generators
- Concern for industry competitiveness with high electricity prices
- **Which is the primary motivation for policy?**
 - **Important because a given policy does not necessarily “solve” both concerns**
- **Also need to consider “unintended effects” of policies on electricity and allowance markets**

Policies may impede efficiency of electricity markets



- Policies to alter electricity prices can lead to “unintended effects” by causing distortions
 - Wholesale price regulation incompatible with liberalized markets
 - Retail price regulation risks viability of retail providers
 - Potential for “California style” imbalances with potential bankruptcies
- “Windfall profits” could be addressed without intervention in electricity market
 - E.g., through allowance market, auctioning of allowances
 - These policies would not distort electricity markets
- But, most policies appear to be concerned about high electricity prices, not generator profits

Policies may impede cost-efficiency of trading scheme



- Limiting wholesale prices
 - New entrant composition changed, less incentive for low-CO₂ generation
- Limiting retail prices
 - Less incentive for abatement through energy efficiency improvement, decreases in output, and reduced use of energy services

Restricting electricity prices would lead to higher CO₂ allowance price and higher overall cost of meeting the EU ETS emissions cap

None of the policies achieve both objectives without adverse effects



Policy	Intended effects?		Unintended effects?		Likely feasibility
	Electricity price	Generator profits	Electricity market	Allowance market	
Adjust allocation / tax "profits"	No	Yes	No	No	Feasible
Revenue "recycling"	Possibly	Possibly	Yes (inefficient transmission charges)	Yes (higher cost)	Questionable
Restrict wholesale prices	Yes	Yes	Yes (regulated pricing)	Yes (higher cost)	Questionable (market liberalization)
Restrict retail prices	Yes	No	Yes (bankruptcies, supply shortages)	Yes (higher cost)	Questionable (market liberalization)



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Conclusions

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- “Windfall profits” (and “losses”) result from many market conditions in liberalised markets and thus is not a particularly helpful concept
- Many “real world” factors complicate the size of the likely electricity price increase and thus extent of any “windfall profits”
- Existing empirical information suggests current CO₂ costs are being included in electricity prices, but the relationship is complex
- Future linkages remain uncertain, more so in light of “updating” of allocations and market uncertainties (e.g., oil price)
- None of the proposed policies appear likely to reduce both “windfall profits” and electricity price increases without compromising efficient operation of the CO₂ allowance market and/or the electricity market

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